STANDPIPE DESIGN INTENT
2003 NFPA 14
To Accompany Architectural Review

Listed items require revision/clarification by contractual documentation (i.e., revised drawings, specifications, addenda, etc.) before plans can be approved. *Answers in letter form are not acceptable*. The Design Intent must be submitted by a fire protection sprinkler system engineer or architect. **Starting construction before plan approval may be considered as just cause, by the State, to issue a stop work order. [Rule 0780-2-7-.09]**

I. Submittal Requirements

1. Provide two sets of engineer designed fire protection plans with preliminary hydraulic calculations submitted by a Tennessee registered designer.

2. Provide a standpipe system schematic as it enters the building to the top most outlet of each standpipe. Include the FDC, all isolation valves, tamper switches, gauges, drains, and outlets. Provide the elevation of each standpipe outlet.

3. The design of the standpipe system is governed by building height, area per floor, occupancy classification, egress system design, required flow rate and residual pressure, and the distance of the hose connection from the source of the water supply. [NFPA 14 7.1] Show this information on the plans and diagram.

4. Identify on plans the class and type of the proposed standpipe system (Class I, II, or III; automatic, semiautomatic, manual, wet, dry). [NFPA 14 5.3]

    A. Class I standpipe systems in buildings not classified as high-rise buildings may be manual, automatic, or semiautomatic. [NFPA 14 5.4.1.1]
    B. Class I standpipe systems in high-rise buildings must be automatic or semiautomatic (manual systems are not permitted). [NFPA 14 5.4.1.2]
    C. Class I standpipe systems must be wet systems except where the piping is subject to freezing. [NFPA 14 5.4.1.4]
    D. Class II or Class III standpipes must be automatic-wet or semiautomatic-wet systems unless it is subject to freezing. [NFPA 14 5.4.3]

5. Where a manual standpipe system is provided, each hose connection must have a conspicuous sign that reads “Manual Standpipe For Fire Department Use Only.” [NFPA 14 5.4.2]

6. Where required by the AHJ, automatic or semiautomatic systems must have listed waterflow and supervisory alarms. [NFPA 14 5.7.1]

7. Circuits for remote control devices on semi-automatic standpipe systems must be supervised in accordance with 2002 NFPA 72, *National Fire Alarm Code*. [NFPA 14 5.5]

II. Water Supply Availability and System Demand

1. Provide preliminary calculations with the minimum flow rates required by NFPA 14 7.10 (pressure requirements are listed separately):

   A. Class I and III: 500 gpm for the first standpipe and 250 gpm for each additional with a total not to exceed 1,250 gpm for unsprinklered buildings and 1,000 gpm for sprinklered buildings. [NFPA 14 7.10.1.1.1 and 7.10.1.1.3]
   B. Class II: 100 gpm for the most remote hose connection NFPA 14 7.10.2.1.1. No additional flow is required where more than one hose connection is provided.

2. Provide preliminary calculations with the minimum and maximum pressure limits.

   A. A minimum residual pressure of 100 psi for the hydraulically most remote 2½" hose connection (at 500 gpm). And 65 psi residual pressure is required for the hydraulically most remote 1½" hose connection (at 100 gpm). [NFPA 14 7.8.1]
   B. Pipe schedule designed standpipe systems must have piping sized in accordance with the pipe schedule in Table 7.8.2.1 to provide the required water flow rate at a minimum residual pressure 100 psi at the highest 2½" hose connection and 65 psi at the highest 1½" hose. [NFPA 14 7.8.2.1]
   C. Pipe schedule designs shall be limited to wet standpipes for buildings that are not high-rise buildings. [NFPA 14 7.8.2.2]
   D. Where the residual pressure at 1½" hose connections exceeds 100 psi, an approved pressure regulating device must be provided to limit the residual pressure. [NFPA 14 7.8.3.1]
   E. Where the static pressure at the hose connection exceeds 175 psi, an approved pressure regulating device must be provided to limit the static and residual pressures to 100 psi for 1½" hose connections and 175 psi for other hoses. [NFPA 14 7.8.3.2]
   F. The pressure on the inlet side of the pressure regulating device must not exceed the devices rated working pressure. [NFPA 14 7.8.3.3]
   G. The maximum pressure at any point in the system at any time shall not exceed 350 psi. [NFPA 14 7.2]

3. The calculations for the maximum flow rate for individual connections are:

   A. For 2½" hose connections - 250 gpm. [NFPA 14 7.10.3.1 and NFPA 14 7.10.1.2]
   B. For 1½" hose - 100 gpm. [NFPA 14 7.10.3.2]

III. Above-Ground

1. The minimum size for standpipes is:

   A. Class I and III - 4" minimum. [NFPA 14 7.6.1]
   B. Combined system - 6" minimum. [NFPA 14 7.6.2] For fully sprinklered buildings - 4" minimum if the system is hydraulically calculated. [NFPA 14 7.6.3]
   C. Branch lines must be sized hydraulically but may be no less than 2½ inches. [NFPA 14 7.6.4]

2. The fire department connection (FDC) must be installed as follows. [NFPA 14 6.3.3 and 6.3.5]

   A. The FDC must be on the street side of the building and have a designated sign. [NFPA 14 6.3.5.1]
   B. Automatic-Wet and Manual-Wet Standpipe Systems: On the system side of system control valve, check valve or any pump, but on the supply side of any isolated valves required in NFPA 14 6.2.2.
   C. Automatic-Dry Standpipe Systems: On the system side of the control valve and check valve and or supply side of the dry pipe valve.
   D. Semiautomatic-Dry Standpipe Systems: On the system side of the deluge valve.
   E. Manual-Dry Standpipe Systems: Directly connected to system piping.
   F. High-rise buildings must have two remotely located FDCs. [NFPA 14 7.13.2]

3. The location and protection of piping must be as follows (connections from fire pumps and sources outside the building should be made at the base of the standpipe). [NFPA 14 Section 6.1 and A.6.1]

   A. Dry standpipes must not be concealed unless the piping integrity is monitored with supervisory air pressure. [NFPA 14 6.1.1]
   B. Standpipes and lateral piping supplied by standpipes must be located in enclosed exit stairs or protected to the same degree as stairs. [NFPA 14 6.1.2.2]
   C. Protection of lateral piping to 2½" hose connections in sprinklered buildings can be omitted, and piping connecting standpipes to 1½" hose lines can be omitted. [NFPA 14 6.1.2.1 and 6.1.2.2.2.]
   D. Piping for standpipes must not be run under buildings. [NFPA 14 6.1.2.6] Where it's absolutely necessary to run pipe under buildings, special precautions must be taken that include arching the foundation walls over the pipe, running in covered trenches, etc. [NFPA 14 6.1.2.6.1]
   E. To minimize or prevent pipe breakage where subject to earthquakes, the standpipe system must be protected in accordance with NFPA 13. [NFPA 14 6.1.2.5]

4. Where two or more standpipes are installed in the same building, they must be interconnected. [NFPA 14 7.5.1] The FDC should be arranged to supply all interconnected standpipes. [NFPA 14 A.7.5, Figure A.7.1(a), A.7.1(b) and A.7.1(c)] Check valves must be installed at the base of each standpipe to prevent circulation. [NFPA 14 7.5.2.1]

5. Installation requirements for valves are as follows (NFPA 14 Chapter 6):

   A. An indicating type valve and check valve must be installed at each water supply. [NFPA 14 6.2.1]
   B. Provide an isolation valve for each standpipe. [NFPA 14 6.2.2]
   C. Combined sprinkler/standpipe systems must have an individual control valve *and check valve* at each sprinkler connection. [NFPA 14 6.2.5.1]
   D. A Post Indicator Valve must be installed for the water supply and be at least 40 ft from the building. [NFPA 14 6.2.6.1]
   E. Valves must be supervised by one of the methods in NFPA 14 6.2.7.

6. Locations for hose connections must be as follows:

   A. Hose connections and hose stations must be unobstructed and located between 3 ft and 5 ft from the floor. [NFPA 14 7.3.1]
   B. Class I systems must be located (NFPA 14 7.3.2):

      1. At each intermediate landing between floor levels in every required exit stair;
      2. On each side of the wall adjacent to the exit opening of fire rated horizontal exits;
      3. At the highest landing of stair which accesses roof and on the roof where the stairwell does not have access to the roof;
      4. In other than covered mall buildings, in each exit passageway at the entrance from the building areas into the passageway;
      5. In covered mall buildings, at the entrance to each exit passageway or exit corridor and at the interior side of the public entrance from the exterior to the mall.

   C. Class II systems must be provided with 1½" hose connections within 130 feet measured along the path of travel of every floor. [NFPA 14 7.3.3]
   D. Class III hose stations must be provided as for Class I and II systems. Hose stations may be equipped with a 2½" x 1½" reducer and a cup attached with a chain in fully sprinklered buildings and the 130 feet travel distance limitation shall not apply. [NFPA 14 7.3.4]

7. Where a zoned system is used, see NFPA 14 7.9. Each zone requiring pumps must be provided with a separate pump. [NFPA 14 7.9.1]

8. Specify the method of support for the standpipes. [NFPA 14 6.4.1] For support of horizontal piping see NFPA 14 6.4.2.

9. For the location, type, and draining arrangements of gauges, see NFPA 14 5.6. [NFPA 14 5.6.1, 5.6.1.1, 5.6.1.2, 5.6.1.3, and 5.6.2]

10. Provide a main drain test connection. [NFPA 14 7.12.3] It must be sized in accordance with Table 7.12.2.2.

11. Provide a method to drain all low points of the system. Drains must be located downstream of the isolation valves. The drain must discharge to an approved location. [NFPA 14 7.12.2.1]

12. A drain riser must be installed adjacent to each standpipe equipped with pressure regulating devices. [NFPA 14 7.12.1]

13. Where an existing standpipe system with a minimum of 4" diameter piping is utilized to supply a new retrofit sprinkler system, the water supply required by section NFPA 14 7.10 shall not be required to be provided by an automatic or semiautomatic means, provided that the water supply is adequate to supply the hydraulic demand of the sprinkler system in accordance with NFPA 13. [NFPA 14 5.4.1.3]